

REMARKS

In the April 11, 2007 Office Action, claims 1-3, 5-12, 14-19, 22-24 and 26-28 stand rejected in view of prior art, while claim 21 was indicated as allowed. Claims 1-3, 5-12, 14-19, 22-24 and 26-28 were also rejected for failing to comply with 35 U.S.C. §112 first and second paragraphs.

Status of Claims and Amendments

In response to the April 11, 2007 Office Action, Applicants have amended the claims as indicated above. Thus, claims 1-3, 5-12, 14-19, 21-24 and 26-28 are pending, with claims 1, 10, 21, 23 and 28 being the independent claims. Reconsideration of the pending claims is respectfully requested in view of the above amendment and the following comments.

Interview Summary

On July 10, 2007, the undersigned conducted a personal interview with Examiner Lu, who is in charge of the above-identified patent application. During the interview, claims 2, 3, 5, 10, 11, 12, 18, 19, 23 and 24 were discussed. The similarity of the angle of the substrates and the nozzle as claimed in claims 2, 11 and 24 was discussed. The Examiner suggested that Applicants point to the benefits of the claimed angles in the specification. Regarding claims 3 and 12, the requirement of 1) determining an introduction direction and 2) determining an introduction initial speed was discussed. In regards to claim 5, it was pointed out that the method increases a supplying quantity during exhausting. Regarding claims 10 and 23, the means for controlling and controlling device were discussed. The Examiner indicated that the control means was considered a valve and suggested that Applicants point to the control means in the specification to overcome the valve interpretation. The Takase et al patent was discussed as it relates to claim 18. The Taniyama et al patent was discussed as

it relates to claim 19. Applicants wish to thank Examiner Lu for the opportunity to discuss the above-identified patent application during the Interview of July 10, 2007.

Claim Rejections - 35 U.S.C. §112

On pages 2 and 3 of the Office Action, claims 1-3, 5-12, 14-19, 22-24 and 26-28 were rejected under 35 U.S.C. §112, first and second paragraph. In response, Applicants have amended independent claims 1, 10, 23 and 28 to remove any references to “thickness” or “predetermined thickness.”

Applicants believe that the claims now comply with 35 U.S.C. §112, first and second paragraph. Withdrawal of the rejections is respectfully requested.

Rejections - 35 U.S.C. § 102

On pages 4 and 5 of the Office Action, claims 1, 3, 5, 7-12, 14, 17, 22-24 and 28 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,653,045 (Ferrell) or U.S. Patent No. 5,772,784 (Mohindra et al). In response, Applicants have amended independent claims 1, 10, 23 and 28 to clearly define the present invention over the prior art of record.

Independent claims 1, 10, 23 and 28 now recite a control section, control means or controlling step. Support for this amendment can be found at paragraph [0089] of the substitute specification. During the interview of July 10, 2007, the Examiner indicated that the control means was considered a valve. Paragraph [0089] of the specification states that “a control section 10 such as a micro-computer or the like which controls the operation of the processing fluid supplying section 4, the exhausting section 5, and the drying fluid supplying section 6.” Thus, Applicants respectfully submit that the control section, control means or controlling step cannot be considered merely a valve.

Applicants respectfully request withdrawal of the rejections.

Rejections - 35 U.S.C. § 103

In paragraphs 7-11 of the Office Action, claims 1-3, 5-9, 15, 16, 18, 19, 26 and 27 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ferrell in view of Mohindra et al or U.S. Patent No. 4,816,081 (Mehta et al), U.S. Patent No. 6,216,709 (Fung et al), U.S. Patent No. 6,152,153, U.S. (Takase et al) and Patent No. 6,247,479 (Taniyama et al).

As stated above, Ferrell or Mohindra et al does not disclose the claimed limitations of independent claims 1, 10 and 23. Fung et al, Takase et al and Taniyama et al do not remedy the deficiencies of Ferrell and Mohindra et al. Fung et al, Takase et al and Taniyama et al do not disclose or suggest a control section, control means or controlling step as claimed.

Discussion of Dependent Claims

Applicants believe that dependent claims 2, 3, 5-9, 11, 12, 14-19, 22, 24, 26 and 27 are allowable over the prior art of record in that they depend from independent claims 1, 10 and 23, and therefore are allowable for the reasons stated above. Also, the dependent claims are further allowable because they include additional limitations.

The further allowability of a selection of the dependent claims is discussed below.

Dependent Claims 2, 11 and 24

Dependent claim 2 states:

the method houses the substrates within the processing vessel in an inclined condition at a predetermined angle with respect to a vertical plane, ***and supplies the liquid drops of the drying fluid*** using the nozzle with the nozzle inclined at an inclination angle ***same as*** the predetermined angle of the inclined substrates.

During the July 10, 2007 interview the Examiner suggested that Applicants point to the benefits of the claimed angles in the specification. Paragraph [0041] of the substitute specification states:

When the method for drying substrate is employed, the method can house the substrates within the processing vessel in an inclined condition by a predetermined angle, and supply the liquid drops of drying fluid using the nozzle in a direction which is the same direction of the inclined substrates. Therefore, when each substrate has a pattern on one face and when the pattern formed face of a plurality of substrates are positioned in the same side, exhausting of the cleaning fluid is easily performed which is introduced within the inner section of the pattern so that more rapid and better drying is realized.

Thus, more rapid and better drying is realized with the method and device of claims 2, 11 and 24.

Ferrell discloses a fixed nozzle assembly 606 and fixed valves 612 and 614 that are not inclined at an inclination angle. Ferrell does not disclose housing the substrates 601 within the housing 602 at an inclined position. Mohindra et al does disclose inclining a substrate carrier 242. However, Mohindra et al discloses fixed gas inlets 302, 304 and 306 that are not at an inclination angle. Therefore, the combination of Ferrell and Mohindra et al does not show substrates in an inclined condition *and* supplying liquid drops of the drying fluid with the nozzle inclined at an inclination angle *same as* the predetermined angle of the inclined substrates.

In Figure 1, Mehta et al illustrates wafers 20 at an inclined condition and discloses an outlet from valves 60, 82 at an inclined condition.

Mehta et al does not supply *liquid drops of a drying fluid*. As stated on page 5 of the Office Action, Mehta et al teach supplying inert *gas* into the processing vessel during exhausting of the cleaning liquid. See column 6, lines 24-30. Accordingly, it is unclear why one of ordinary skill in the art would be motivated to combine Ferrell, which does not disclose supplying liquid drops of the drying fluid with a nozzle inclined at an inclination angle, with Mehta et al, which does not disclose supplying *liquid* drops of a drying fluid. Applicants respectfully submit that there is no suggestion in Mehta et al or Ferrell to *supply*

the liquid drops of the drying fluid using the nozzle with the nozzle inclined at an inclination angle.

Applicants respectfully request allowance of claims 2, 11 and 24 in view of the above comments.

Dependent Claims 3 and 12

Claim 3 recites:

the method determines an introduction direction of the drying fluid into the processing vessel and determines an introduction initial speed of the drying fluid so as to expand the drying fluid up to an entire width of the substrates on the fluid face of the cleaning fluid.

It appears that neither Ferrell, Mohindra et al or Mehta et al determine an introduction direction of the drying fluid and an introduction initial speed of the drying fluid. The Office Action is silent as to how Ferrell, Mohindra et al or Mehta et al disclose a method that *determines* an introduction direction of the drying fluid into the processing vessel and *determines* an introduction initial speed of the drying fluid so as to expand the drying fluid up to an entire width of the substrates on the fluid face of the cleaning fluid. Furthermore, Ferrell, Mohindra et al and Mehta et al do not teach expanding the drying fluid up to an entire width of the substrates on the fluid face of the cleaning fluid.

Claim 12 recites:

the means for introducing the drying fluid determines an introduction direction of the drying fluid into the processing vessel and *determines* an introduction initial speed of the drying fluid so as to expand the drying fluid up to an entire width of the substrates on the fluid face of the cleaning fluid.

The nozzle assembly 606 of Ferrell and the carrier gas inlet 306 of Mohindra et al were designated as the means for introducing a drying fluid in the Office Action. The Office Action is silent as to how the nozzle assembly 606 or the carrier gas inlet 306 *determines an*

introduction direction and *determines an introduction initial speed* of the drying fluid so as to expand the drying fluid up to an entire width of the substrates on the fluid face of the cleaning fluid.

The nozzle assembly 606 of Ferrell produces ultrafine droplets having a low velocity. However, Ferrell and Mohindra et al do not teach expanding the drying fluid up to an entire width of the substrates on the fluid face of the cleaning fluid. Furthermore, the nozzle assembly 606 and the carrier gas inlet 306 are incapable of *determining the introduction direction* and *determining the initial speed* of the drying fluid in order to expand the drying fluid up to an entire width of the substrates on the fluid face of the cleaning fluid.

Applicants respectfully request allowance of claims 3 and 12 in view of the above comments.

Dependent claim 5

Claim 5 recites:

the method *increases a supplying quantity* of the drying fluid and/or the inert gas into the processing vessel *during* exhausting of the cleaning fluid from the processing vessel.

Mohindra et al and Mehta et al disclose introducing an inert gas during exhausting of the cleaning fluid. However, Ferrell, Mohindra et al and Mehta et al *do not* teach a method that *increases a supplying quantity* of the drying fluid and/or the inert gas into the processing vessel *during* exhausting of the cleaning fluid from the processing vessel.

Applicants respectfully request allowance of claim 5 in view of the above comments.

Dependent Claim 18

Claim 18 requires a means for moving the nozzle *towards* the substrates *during* exhausting of the cleaning fluid from the processing vessel.

Column 10, lines 47-63 of Takase et al describes moving the substrates 1 under the nozzles 43, 45, 47. Once the substrates 1 are in position under the nozzles 43, 45, 47, the nozzles 43, 45, 47 are moved reciprocally relative to the substrates 1. Applicants respectfully submit that Takase et al does not disclose means for moving the nozzles *towards* the substrates because the substrates 1 of Takase et al are moved into position before movement of the nozzles 43, 45, 47. Only after the substrates 1 are in position do the nozzles 43, 45, 47 begin to move. However, the movement of the nozzles 43, 45, 47 *is not towards* the substrates 1 but reciprocally relative to the substrates as shown in Figures 9 and 10. Figures 9 and 10 show the nozzles 43, 45, 47 moving in the same longitudinal plane as the substrates 1 once the substrates 1 are in position. In addition, nozzle 47 is described as treating a preselected area extending from one end to another end of the substrate 1. See column 10, lines 28-32. Thus, the nozzles 43, 45, 47 cannot be considered as moving *towards* the substrates 1.

Moreover, Takase et al makes no mention of moving the nozzle towards the substrates *during exhausting of the cleaning fluid from the processing vessel*. Ferrell also *does not* disclose supplying a liquid or a gas *during* exhausting of the cleaning fluid from the processing vessel. Therefore, the combination of Ferrell and Takase et al *does not* disclose: 1) movement of a nozzle *towards* the substrates; and 2) movement of the nozzle *during* exhausting of the cleaning fluid from the processing vessel.

Applicants respectfully request allowance of claim 18 in view of the above comments.

Dependent Claim 19

Claim 19 requires a means for circulating the *drying fluid* when the means for introducing the drying fluid is not introducing the drying fluid under a liquid condition within the processing vessel.

Taniyama et al discloses a circulation circuit 80 for conditioning the chemical solution stored in the tank 71. However, column 9, lines 18-22 of Taniyama et al disclose that the chemical solution in the tank 71 is a mixture solution of ammonia solution and hydrogen peroxide solution used for a washing process. This is not a *drying fluid*. The drying fluid of Taniyama et al is stored in a tank 68a as illustrated in Figure 5. Taniyama et al *does not* disclose a means for circulating the *drying fluid*.

Applicants respectfully request allowance of claim 19 in view of the above comments.

Allowable Subject Matter


In paragraph 12 of the Office Action, claim 21 was indicated as allowed. Applicants wish to thank the Examiner for this indication of allowable subject matter. Thus, independent claim 21 is believed to be allowed.

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Reply to Office Action of April 11, 2007

Conclusion

In view of the foregoing comments, Applicants respectfully assert that claims 1-3, 5-12, 14-19, 21-24 and 26-28 are now in condition for allowance. Reexamination and reconsideration of the pending claims are respectfully requested.

Respectfully submitted,


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